

REMARKS

Reconsideration of the application is requested.

Claims 21-29, 31, 34, and 36-41 remain in the application and are subject to examination. Claims 29, 31, 34, and 36-39 have been allowed. Claims 21-28, 40, and 41 are still being actively examined.

Under the heading "Claim Rejections – 35 USC § 103" on page 2 of the above-identified Office Action, claims 21-28 and 40 have been rejected as being obvious over U.S. Patent No. 6,498,418 B2 to Rueger in view of U.S. Patent No. 5,173,832 to Giorgetta et al. and further in view of U.S. Patent No. 6,619,268 to Rueger et al. under 35 U.S.C. § 103.

It seems clear that the Examiner intended to reject claims 21-28, 40, and 41.

Applicants respectfully traverse. Under the heading "Response to Arguments" on page 6 of the above-identified Office Action, the Examiner stated: "In response to applicant's arguments against the references individually, one cannot show obviousness by attacking references individually where the rejections are based on combinations of references." The Examiner cited *In re Keller* 208 USPQ 871 to support that statement. In *Keller*, the applicant only discussed one reference where the rejection was based on the combination of three references (See 208 USPQ 871, 882).

In the last response, applicants discussed all three references and pointed out that Rueger et al. did not teach or suggest generating a diagnostic signal having values that indicate whether a short circuit exists in dependence on a charge value obtained by integrating a current. Applicants pointed out that by considering what Rueger et al. does and does not teach along with the teachings in Rueger and Giorgetta et al., one of ordinary skill in the art simply cannot arrive at the claimed invention.

Looking at the situation logically, certainly the Examiner could not be taking the position that applicants should not be allowed to evaluate the teaching in each reference and then relate the teachings in all of the references to one another. If this is in fact the position of the Examiner, applicants respectfully request that the Examiner discuss the issue with the Primary Examiner. It should be very clear that the only way to evaluate what is suggested by the prior art is to evaluate the individual teachings of the references and then to relate these individual teachings to each other.

Let us now evaluate the teachings in the cited prior art in detail.

The Examiner has stated that U.S. Patent No. 6,498,418 B2 to Rueger does not disclose generating a diagnostic signal in dependence on the voltage in the actuator circuit, the diagnostic signal assuming any of at least four mutually different values respectively indicating a ground short circuit, a short circuit to a supply voltage, a short across the actuator, or an error-free state in

dependence on an outcome of the comparing step and the charge value.

Applicants agree with that statement.

The Examiner has stated that U.S. Patent No. 6,619,268 to Rueger et al. teach integrating a current resulting in a charge quantity. Applicants also agree with that statement.

The Examiner, however, has also stated that it would have been obvious to modify the Rueger device with the teachings of Rueger et al. because it allows an improved measurement of the charge quantity. Maybe it would have been obvious to make such a modification-maybe not. The issue is irrelevant because the more important issue relates to what such a modification would have been. One simply could not have obtained the claimed invention by modifying the Rueger device in accordance with the teachings of Rueger et al. Rueger et al. merely teach measuring a charge quantity in order to determine the capacitance of the piezoelectric element so that a temperature compensation factor can be determined and used to adjust the maximum actuator travel of the piezoelectric element. Rueger et al. do not teach or suggest a diagnostic signal having values that indicate whether a short circuit exists in dependence on a charge value obtained by integrating a current. Specifically with regard to claims 21 and 41, there is no teaching or suggestion related to a diagnostic signal assuming any of at least four mutually different values respectively indicating a ground short circuit, a short circuit to a supply

voltage, a short across the actuator, or an error-free state in dependence on an outcome of the comparing step and the charge value.

Rueger et al. teach that the maximum travel of a piezoelectric element may be reduced considerably at very low temperatures, that the temperature dependence of the piezoelectric element should be considered when designing a fuel injection system, and that the capacitance of the piezoelectric element may be used to estimate the temperature of the piezoelectric element (Please see column 1, line 65 through column 2, line 11). Rueger et al. go on to teach that the capacitance of the piezoelectric element depends on a charge rate that is delivered to the piezoelectric element and that this charge rate corresponds to the frequency dependent on the beginning and end of the charge procedure (Please column 2, lines 48-64). By compensating for the frequency dependence of the piezoelectric element, the maximum actuator travel may be estimated and adjusted (Please see column 2, line 65 through column 3, line 3).

Rueger et al. teach a capacitance determining block 8001 that determines the capacitance of the piezoelectric element based on several measured values- one of which is a charge quantity (See Fig. 7c and column 25, line 64 through column 26, line 21). Fig. 7d and column 27, lines 5-12 teach the relationship between the charge quantity and the capacitance of the piezoelectric element. Importantly, column 27, lines 13-16 teach that the capacitance of the piezoelectric element, which has been determined from the charge quantity,

can be used to determine a temperature compensation factor  $K_T$  associated with the piezoelectric element. Fig. 7a and column 18, lines 10-47 teach that this temperature compensation factor  $K_T$  is used in a temperature compensation block 2501 to **actuate** the piezoelectric element.

Column 30, lines 22-23, which the Examiner has cited, refers to the charge quantity determining arrangement 800 shown in Fig. 11. It is stated that the quantity determining arrangement 800 shown in Fig. 11 can be used to improve the measurement of the charge quantity. But again, this measured charge quantity is used to determine a temperature compensation factor  $K_T$  that is used in a temperature compensation block 2501 to **actuate** the piezoelectric element.

After reviewing this lengthy and thorough discussion of the teaching in Rueger et al., it should be very clear that Rueger et al. teach measuring a charge quantity to determine a temperature compensation factor  $K_T$  that is used in a temperature compensation block 2501 to **actuate** the piezoelectric element.

In contrast to the invention as defined by claims 21 and 41, Rueger et al. do not teach or suggest a diagnostic signal assuming any of at least four mutually different values respectively indicating a ground short circuit, a short circuit to a supply voltage, a short across the actuator, or an error-free state in dependence on an outcome of the comparing step and this charge quantity.

Giorgetta et al., as the Examiner has recognized, do not teach or suggest anything related to a charge value. Giorgetta et al. merely teach supplying the voltage on line 10A to a comparator and the voltage on line 8A to a comparator to determine whether normal operation or one of three fault conditions has occurred (See the table below column 4 and column 5, line 1 through column 6, line 29). The voltage on line 8 is indicative of the current flowing through the emitter of transistor 2A.

Additionally, U.S. Patent No. 6,498,418 B2 to Rueger, as the Examiner has recognized, does not teach or suggest anything related to a charge value.

Therefore, if one of ordinary skill in the art considered the teachings in all three cited references, the only thing that might possibly have been suggested, which is related to a charge quantity, is using the charge quantity in Rueger et al. to compensate for a low temperature and to thereby better actuate the piezoelectric element in the device of Rueger. Giorgetta et al. may possibly have suggested supplying more than one voltage to a comparator, which again has nothing to do with using a charge quantity to indicate whether a short circuit exists.

The invention as defined by claims 21 and 41 is not taught or suggested by the prior art.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claim 21 or claim 41. Claim 21 and claim 41 are, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claim 21.

In view of the foregoing, reconsideration and allowance of claims 21-28, 40 and 41 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate receiving a telephone call so that, if possible, patentable language can be worked out.

Please charge any fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner Greenberg Sterner LLP, No. 12-1099.

Respectfully submitted,

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December 19, 2007

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